WHAT IS CLAIMED IS:

1. An interlayer dielectric film comprising a three-dimensionally polymerized polymer having a number of molecular level pores inside, formed by polymerizing first cross-linking molecules having a three-dimensional structure and second cross-linking molecules having a two-dimensional structure.

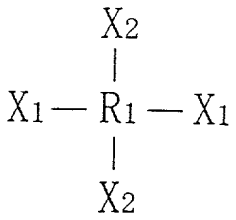
2. The interlayer dielectric film of Claim 1, wherein the first cross-linking molecules are first organic molecules having three or more sets of functional groups in one molecule,

the second cross-linking molecules are second organic molecules having two sets of functional groups in one molecule, and

the three-dimensionally polymerized polymer is formed by binding the three or more sets of functional groups of each of the first organic molecules and the two sets of functional groups of each of the second organic molecules together.

3. The interlayer dielectric film of Claim 2, wherein the first organic molecules are represented by

[chemical formula 1]



(where R_1 is a first organic skeleton, X_1 is a first set of functional groups, and X_2 is a second set of functional groups, X_1 and X_2 being same or different in type),

the second organic molecules are represented by

[chemical formula 2]

$$Y_1 - R_2 - Y_2$$

(where R_2 is a second organic skeleton, Y_1 is a third set of functional groups, and Y_2 is a fourth set of functional groups, Y_1 and Y_2 being same or different in type),

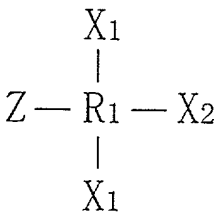
the three-dimensionally polymerized polymer is formed by binding the first set of functional groups (X_1) and the third set of functional groups (Y_1) together and binding the second set of functional groups (X_2) and the fourth set of functional groups (Y_2) together, and

the molecular level pores are formed in regions surrounded by the first organic skeletons (R_1) and the second organic skeletons (R_2).

4. The interlayer dielectric film of Claim 2, wherein

the first organic molecules are represented by

[chemical formula 3]



(where R_1 is a first organic skeleton, X_1 is a first set of

functional groups, X_2 is a second set of functional groups, and Z is a third set of functional groups, X_1 and X_2 being same or different in type),

the second organic molecule is represented by

[chemical formula 4]

$$Y_1 - R_2 - Y_2$$

(where R_2 is a second organic skeleton, Y_1 is a fourth set of functional groups, and Y_2 is a fifth set of functional groups, Y_1 and Y_2 being same or different in type),

the three-dimensionally polymerized polymer is formed by first binding the first set of functional groups (X_1) and the fourth set of functional groups (Y_1) together and binding the second set of functional groups (X_2) and the fifth set of functional groups (Y_2) together to form a plurality of units and then binding the third sets of functional groups (Z) of the plurality of units together, and

the molecular level pores are formed in regions surrounded by the first organic skeletons (R_1) and the second organic skeletons (R_2) in the plurality of units.

5. A method for forming an interlayer dielectric film, comprising the step of:

polymerizing first cross-linking molecules having a three-dimensional structure and second cross-linking molecules having a two-dimensional structure to form an interlayer dielectric film comprising a three-dimensionally

polymerized polymer having a number of molecular level pores.

6. The method for forming an interlayer dielectric film of Claim 5, wherein the first cross-linking molecules are first organic molecules having three or more sets of functional groups in one molecule,

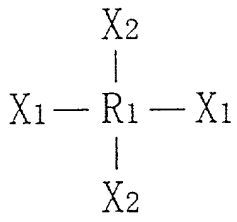
the second cross-linking molecules are second organic molecules having two sets of functional groups in one molecule, and

the three-dimensionally polymerized polymer is formed by binding the three or more sets of functional groups of each of the first organic molecules and the two sets of functional groups of each of the second organic molecules together.

7. The method for forming an interlayer dielectric film of Claim 6, wherein

the first organic molecules are represented by

[chemical formula 1]



(where R_1 is a first organic skeleton, X_1 is a first set of functional groups, and X_2 is a second set of functional groups, X_1 and X_2 being same or different in type),

the second organic molecules are represented by

[chemical formula 2]

$$Y_1 - R_2 - Y_2$$

(where R_2 is a second organic skeleton, Y_1 is a third set of functional groups, and Y_2 is a fourth set of functional groups, Y_1 and Y_2 being same or different in type),

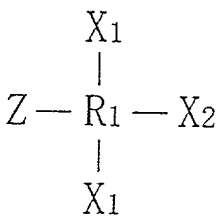
the three-dimensionally polymerized polymer is formed by binding the first set of functional groups (X_1) and the third set of functional groups (Y_1) together and binding the second set of functional groups (X_2) and the fourth set of functional groups (Y_2) together, and

The molecular level pores are formed in regions surrounded by the first organic skeletons (R_1) and the second organic skeletons (R_2).

8. The method for forming an interlayer dielectric film of Claim 6, wherein

the first organic molecules are represented by

[chemical formula 3]



(where R_1 is a first organic skeleton, X_1 is a first set of functional groups, X_2 is a second set of functional groups, and Z is a third set of functional groups, X_1 and X_2 being same or different in type),

the second organic molecules are represented by

[chemical formula 4]

$$Y_1 - R_2 - Y_2$$

(where R_2 is a second organic skeleton, Y_1 is a fourth set of functional groups, and Y_2 is a fifth set of functional groups, Y_1 and Y_2 being same or different in type),

the three-dimensionally polymerized polymer is formed by first binding the first set of functional groups (X_1) and the fourth set of functional groups (Y_1) together and binding the second set of functional groups (X_2) and the fifth set of functional groups (Y_2) together to form a plurality of units and then binding the third sets of functional groups (Z) of the plurality of units together, and

the molecular level pores are formed in regions surrounded by the first organic skeletons (R_1) and the second organic skeletons (R_2) in the plurality of units.

9. A method for forming an interconnection, comprising the steps of:

forming an interlayer dielectric film comprising a three-dimensionally polymerized polymer having a number of molecular level pores inside, by polymerizing first cross-linking molecules having a three-dimensional structure and second cross-linking molecules having a two-dimensional structure;

forming a surface barrier film on the interlayer dielectric film;

forming a mask on the surface barrier film;

forming an concave portion in the surface barrier film and the interlayer dielectric film by etching the surface barrier film and the interlayer dielectric film using the mask; and

forming an interconnection made of a metal material by filling the concave portion with the metal material.

10. The method for forming an interconnection of Claim 9, wherein the first cross-linking molecules are first organic molecules having three or more sets of functional groups in one molecule,

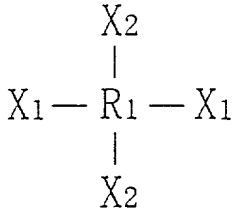
the second cross-linking molecules are second organic molecules having two sets of functional groups in one molecule, and

the three-dimensionally polymerized polymer is formed by binding the three or more sets of functional groups of each of the first organic molecules and the two sets of functional groups of each the second organic molecules together.

11. The method for forming an interconnection of Claim 10, wherein

the first organic molecules are represented by

[chemical formula 1]



(where R_1 is a first organic skeleton, X_1 is a first set of functional groups, and X_2 is a second set of functional groups, X_1 and X_2 being same or different in type),

the second organic molecules are represented by

[chemical formula 2]

$$Y_1 - R_2 - Y_2$$

(where R_2 is a second organic skeleton, Y_1 is a third set of functional groups, and Y_2 is a fourth set of functional groups, Y_1 and Y_2 being same or different in type),

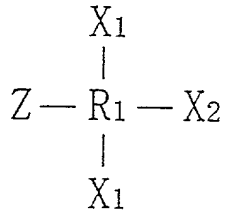
The three-dimensionally polymerized polymer is formed by binding the first set of functional groups (X_1) and the third set of functional groups (Y_1) together and binding the second set of functional groups (X_2) and the fourth set of functional groups (Y_2) together, and

The molecular level pores are formed in region surrounded by the first organic skeletons (R_1) and the second organic skeletons (R_2).

12. The method for forming an interconnection of Claim 10, wherein

the first organic molecules are represented by

[chemical formula 3]



(where R_1 is a first organic skeleton, X_1 is a first set of functional groups, X_2 is a second set of functional groups, and Z is a third set of functional groups, X_1 and X_2 being same or different in type),

the second organic molecules are represented by

[chemical formula 4]

$$Y_1 - R_2 - Y_2$$

(where R_2 is a second organic skeleton, Y_1 is a fourth set of functional groups, and Y_2 is a fifth set of functional groups, Y_1 and Y_2 being same or different in type),

the three-dimensionally polymerized polymer is formed by first binding the first set of functional groups (X_1) and the fourth set of functional groups (Y_1) together and binding the second set of functional groups (X_2) and the fifth set of functional groups (Y_2) together to form a plurality of units and then binding the third sets of functional groups (Z) of the plurality of units together, and

the molecular level pores are formed in regions surrounded by the first organic skeletons (R_1) and the second organic skeletons (R_2) in the plurality of units.

13. A method for forming an interconnection, comprising the steps of:

forming an interlayer dielectric film comprising a three-dimensionally polymerized polymer having a number of molecular level pores inside, by polymerizing first cross-

linking molecules having a three-dimensional structure and second cross-linking molecules having a two-dimensional structure;

forming a mask on the interlayer dielectric film;

forming an concave portion in the interlayer dielectric film by etching the interlayer dielectric film using the mask;

forming a sidewall barrier film on sidewalls of the concave portion; and

forming an interconnection made of a metal material by filling the concave portion having the sidewall barrier film with the metal material.

14. The method for forming an interconnection of Claim 13, further comprising the step of forming a surface barrier film on the interlayer dielectric film between the step of forming an interlayer dielectric film and the step of forming a mask,

wherein the step of forming an concave portion comprises the step of forming a concave portion in the surface barrier layer and the interlayer dielectric film by etching the surface barrier film and the interlayer dielectric film using the mask.

15. The method for forming an interconnection of Claim 13, wherein the first cross-linking molecules are first organic molecules having three or more sets of functional

groups in one molecule,

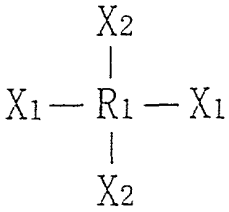
the second cross-linking molecules are second organic molecules having two sets of functional groups in one molecule, and

the three-dimensionally polymerized polymer is formed by binding the three or more sets of functional groups of each of the first organic molecules and the two sets of functional groups of each of the second organic molecules together.

16. The method for forming an interconnection of Claim 15, wherein

the first organic molecules are represented by

[chemical formula 1]



(where R_1 is a first organic skeleton, X_1 is a first set of functional groups, and X_2 is a second set of functional groups, X_1 and X_2 being same or different in type),

the second organic molecules are represented by

[chemical formula 2]

$$Y_1 - R_2 - Y_2$$

(where R_2 is a second organic skeleton, Y_1 is a third set of functional groups, and Y_2 is a fourth set of functional groups, Y_1 and Y_2 being same or different in type),

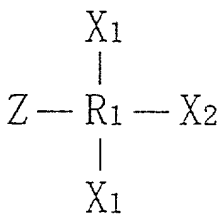
The three-dimensionally polymerized polymer is formed by binding the first set of functional groups (X_1) and the third set of functional groups (Y_1) together and binding the second set of functional groups (X_2) and the fourth set of functional groups (Y_2) together, and

The molecular level pores are formed in region surrounded by the first organic skeletons (R_1) and the second organic skeletons (R_2).

17. The method for forming an interconnection of Claim 15, wherein

the first organic molecules are represented by

[chemical formula 3]



(where R_1 is a first organic skeleton, X_1 is a first set of functional groups, X_2 is a second set of functional groups, and Z is a third set of functional groups, X_1 and X_2 being same or different in type),

the second organic molecules are represented by

[chemical formula 4]

$$Y_1 - R_2 - Y_2$$

(where R_2 is a second organic skeleton, Y_1 is a fourth set of functional groups, and Y_2 is a fifth set of functional

groups, Y_1 and Y_2 being same or different in type),

the three-dimensionally polymerized polymer is formed by first binding the first set of functional groups (X_1) and the fourth set of functional groups (Y_1) together and binding the second set of functional groups (X_2) and the fifth set of functional groups (Y_2) together to form a plurality of units and then binding the third sets of functional groups (Z) of the plurality of units together, and

the molecular level pores are formed in regions surrounded by the first organic skeletons (R_1) and the second organic skeletons (R_2) in the plurality of units.